

NON-PUBLIC?: N  
ACCESSION #: 9406170083  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Peach Bottom Atomic Power Station Unit 2 PAGE: 1 OF 04

DOCKET NUMBER: 05000277

TITLE: Unit 2 Scram on High Neutron Flux Condition  
EVENT DATE: 05/15/94 LER #: 94-003-00 REPORT DATE: 06/13/94

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Anthony J. Wasong, Experience TELEPHONE: (717) 456-7014  
Assessment Manager

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

#### ABSTRACT:

On 5/15/94, the "2A" Reactor Recirculating (RECIRC) Pump experienced an unexpected speed increase. This caused a reactor power spike which reached the Average Power Range Monitor (APRM) High Neutron Flux Scram Setpoint. It was determined that the "2A" RECIRC Pump speed increase was due to a mismatch between the Blind Controller and the Linear Variable Differential Transformer (LVDT) output signals. Troubleshooting concluded that the decrease in the LVDT output signal was caused by a spurious problem with either the LVDT or its demodulator. A spare LVDT and demodulator was installed and calibrated to control the "2A" RECIRC Scoop Tube Positioner over the full range of motion. The inputs to the strip chart recorder installed on this pump to monitor RECIRC M/G set control system performance have been modified to include a channel to monitor the status of the electrical power supply to the Scoop Tube Positioner. An evaluation will be performed to identify what actions can be taken to mitigate the effects of a future similar failure. The RECIRC M/G Sets are scheduled to be

replaced with improved Adjustable Speed Drive units during the next Refueling Outages. The components which malfunctioned will be eliminated as part of this modification. No previous similar events have been identified.

END OF ABSTRACT

TEXT PAGE 2 OF 04

#### Requirements of the Report

This report is being submitted pursuant to 10 CFR 50.73 (a)(2)(iv) due to an unplanned Engineered Safety Feature (ESF) actuation when the reactor scrammed on a high neutron flux condition.

#### Unit Conditions at Time of Event

Unit 2 was in the "RUN" mode at approximately 87 % of rated thermal reactor power. There were no systems, structures, or components that were inoperable that contributed to the event.

#### Description of the Event

On 5/15/94 at 1730 hours, the "2A" Reactor Recirculating (RECIRC) Pump (EIS:AD) experienced an unexpected speed increase. This caused a reactor power spike which reached the Average Power Range Monitor (APRM) (EIS:IG) High Neutron Flux Scram Setpoint. A Reactor Protection System (RPS) (EIS:JC) Scram occurred when the high flux condition was detected by the APRMs. Primary Containment Isolation System (PCIS) (EIS:JM) Group II/III isolations occurred as expected due to Reactor water level dropping below 0" as a result of void collapse upon insertion of the control rods. Reactor water level decreased to approximately -25 inches and the Feedwater system was used to recover and stabilize water level at + 23 inches. The PCIS and the RPS scram logics were reset by 1808 hours and the affected systems were restored to the appropriate configuration. The NRC was notified of the event at 1925 hours.

#### Cause of the Event

The high flux condition was caused by an unexpected speed increase on the "2A" RECIRC Pump. The resulting increase in core flow improved reactor moderation which resulted in increased neutron flux. From the strip chart recorder installed on this pump to monitor RECIRC M/G set control system performance, it was determined that the "2A" RECIRC Pump speed increase was due to a mismatch between the Blind Controller and the Linear Variable Differential Transformer (LVDT) output signals. This occurred when the

LVDT voltage output signal, which senses the position of the RECIRC Scoop Tube Positioner, decreased. This caused the electrical control logic to the positioner to compensate for the decrease in LVDT output voltage. When the electrical control logic compensated for the mismatch, the Scoop Tube Positioner motor adjusted the scoop tube to increase M/G set output. A decrease in the LVDT voltage output signal could have happened for two reasons. The first possible cause was the loss of electrical power to the Scoop Tube Positioner. During troubleshooting an instantaneous loss of power was simulated several times. When the power was restored, the Scoop Tube Positioner

TEXT PAGE 3 OF 4

never moved to increase RECIRC speed above the original level. The second possible cause was an instantaneous failure of the LVDT output voltage or its associated demodulator unit. The Scoop Tube Positioner was exercised multiple times over the full range of motion and a failure could not be detected. Since the loss of power simulation never caused the LVDT to adjust the Scoop Tube Positioner and increase RECIRC speed, it was concluded that the decrease in the LVDT output signal was caused by a spurious problem with either the LVDT or its demodulator. The demodulator is an electronic device which takes the LVDT output AC signal and converts it to a DC signal.

#### Analysis of Event

No actual safety consequences occurred as a result of this event. All automatic isolations and initiations functioned per design. Had the event occurred at 100 % thermal reactor power, all RPS and PCIS systems would have functioned as designed to mitigate the consequences of the event.

#### Corrective Actions

The PCIS and the RPS scram logics were reset and the affected systems were restored to the appropriate configuration.

A spare LVDT and demodulator was installed and calibrated to control the "2A" RECIRC Scoop Tube Positioner over the full range of motion.

The inputs to the strip chart recorder installed on this pump to monitor RECIRC M/G set control system performance have been modified to include a channel to monitor the status of the electrical power supply to the Scoop Tube Positioner. Corrective actions will be implemented as appropriate pending any additional data received from this channel.

An evaluation will be performed to identify what actions can be taken to mitigate the effects of a future similar failure. Corrective action will be taken as appropriate pending the results of the evaluation.

In addition, there has been no history of LVDT or demodulator problems at Peach Bottom. The RECIRC M/G Sets are scheduled to be replaced with improved solid state Adjustable Speed Drive units during the next Refueling Outages for both units. This modification is being done to improve system performance, reliability, and reduce maintenance costs. The components which malfunctioned during this event will be eliminated as part of this modification.

TEXT PAGE 4 OF 4

#### Previous Similar Events

No previous similar events have been identified which involved the RECIRC system LVDTs or the demodulator units.

ATTACHMENT TO 9406170083 PAGE 1 OF 1

#### Peach Bottom Atomic Power Station

PECO Energy Company  
PECO ENERGY RD 1, Box 208  
Delta, PA 17314-9739  
717 456 7014

Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

Docket No. 50-277

SUBJECT: Licensee Event Report, Peach Bottom Atomic Power Station-Unit 2

This LER concerns a Unit 2 automatic scram on a high neutron flux when a Recirculating pump increase in speed.

Reference: Docket No. 50-277  
Report Number: 2-94-003  
Revision Number: 00  
Event Date: 05/15/94  
Report Date: 06/13/94  
Facility: Peach Bottom Atomic Power Station

RD1, Box 208, Delta, PA 17314

This LER is being submitted pursuant to the requirements of 10 CFR 50.73 (a)(2)(iv).

Sincerely,

Garrett D. Edwards  
Plant Manager

GDE/GAJ:gaj

enclosure

cc: R.A.Burricelli, Public Service Electric & Gas  
W. P. Dornsife, Commonwealth of Pennsylvania  
INPO Records Center  
T. T. Martin, US NRC, Administrator, Region I  
R. I. McLean, State of Maryland  
W. L. Schmidt, US NRC, Senior Resident Inspector  
C. D. Schaefer, DelMarVa Power  
H. C. Schwemm, VP - Atlantic Electric

CCN 94-14089

\*\*\* END OF DOCUMENT \*\*\*

---